of plant of 6 to 8 feet. The yield was between three-fourths and one bale per acre. The accompanying table shows the result of the two years progeny record. The weight of the 10 boll samples is given in grams. Each plant is followed in the same line by its progeny record —1-1, 2-1, etc.—meaning the second year selections of the plants No. 1 and No. 2. The most noticeable thing in the table is that the average percentage of lint of the progeny decreased in both years in nearly every case. There were, of course, isolated plants that exceeded the record of the parent. There seemed to be no tendency for the plants of low percentage to breed closer to the mean of the variety by increasing the percentage. The loss was greater in 1906 than 1905. The next noticeable point is that the size of boll decreased very greatly in 1905, and that it increased almost as much in 1906.

The general character of the decrease in percentage seems to show that it is due to season or culture, yet the starved water-soaked condition of 1905 was not so bad as the over-crowded rampant growth of 1906. The general condition of the plants in 1905 is reflected in the decreased size of boll, and the favorable growth of 1906 is also quick to show itself in the returning size of boll. There is probably no character that is not largely influenced by the character of season and of cultivation.

The lessons taught by the experiment so far seem to be:

1. The check row system, giving each plant abundant room, say 4 by 4 feet, is the best way to get at individual excellence.
2. It shows the value of making a large number of selections for it is hard to "pick the winner" in the first year's selection.
3. It emphasizes the value of fairly complete progeny records.
4. It shows that the breeder should not be entirely cast down if in a bad season he seems to see all the desirable characters dropping out of his plants. They will probably return with better times.
5. That the breeding plat should have better care than the farm. For it will be possible in this way to enlarge the variations in any one character.

The record has not yet gone far enough to give much light on how much gain may be expected after the first year's "variety testing." It is hoped to carry this part of the experiment to a point where it may be further reported upon in the future.

A PLEA FOR A MORE EXTENDED USE OF THE SYSTEM OF LIVE-STOCK REGISTRATION.

By M. M. Boyd, *Bobcaygeon, Canada.*

Registration of the pedigrees of improved live-stock has only been generally adopted by breeders within the last thirty years or thereabouts. For, although the General Stud Book for Throughbreds (English Race Horses) was founded in 1791, and Coate's Herd Book for Shorthorn cattle begun in 1822, registration was not generally adopted until many years later. The first volume of the Hereford

Herd Book was published in 1862, and that of the Polled Angus and of the Galloway appeared the same year. The Clydesdale Stud Book first appeared in 1878; the Suffolk Horse and the Shire Horse Stud Books in 1880; the Percheron Stud Book of France in 1883; the Cleveland Bay and the Hackney Stud Books in 1884; and the Yorkshire Coach Horse Stud Book in 1887.

Coupled with the privilege of registration in these volumes, restrictions were in every case put upon the breeders, confining (at first with some license but later strictly) their operations within certain lines, and the effect of these restrictions has resulted in fixing to type many breeds which were formerly somewhat diversified and confused, so that now we have a large number of varieties of remarkable uniformity, which reproduce themselves truly.

While these restrictions have had this good effect, they have doubtless during the past two decades prevented the use of many animals, i. e., the adoption in many cases of certain crosses, which would have resulted in great improvement. Most breeders can call to mind in the records of the particular breed in which they are interested, instances in which a marked improvement was made by the use of a sire whose impure blood would have prevented his use in later years when registration lines were more closely drawn. One instance of this kind is the Clydesdale stallion, "Prince of Wales" (673), and another, the Suffolk stallion, "Cup-bearer 3d" (566), both progenitors of untold value to their respective breeds, but both of which would have been excluded from use, had the Stud Book doors been as closely shut in their time as now. So that while these restrictions have a powerful influence for good in conducing to fixity of type, they have also a baneful effect when they exclude blood from the register which if admitted would quickly advance the breed. In the case of two or more distinct varieties each bred for exactly the same useful purpose, as for example, beef in cattle, or draft in horses, one of these may have (and as a matter of fact all do have) a characteristic or well established point of excellence which is lacking altogether or rarely exhibited in one or more of the other varieties. Any interchanges of blood to secure these points of especial excellence, which might thus be gained by one breed from the other, are prohibited by the restrictions coupled with each register. Nevertheless, these restrictions are a decided necessity, and I do not see any scheme for more license which would not be fraught with danger to the breed adopting it. Therefore, we find ourselves in a dilemma betwen necessary restrictions attached to our present registers and the need for more freedom if we are to make the rapid progress that we should.

A way out of this dilemma may, I think, be found in the adoption of more registers, and in order that my meaning may be perfectly clear, I will give an example of one or two such registers:

Example No. 1.—A register involving Hereford and Angus cattle with the object of grafting on the Hereford the polled head and more general tendency to exceptionally well-marbled flesh for which the Angus is celebrated. The first volume open to pure Hereford blood,

and to Hereford mixed with not more than 25 per cent of Angus blood. The percentage of Angus blood to be further restricted in later volumes.

Example No. 2.—A register involving Percheron and Shire horses with the object of grafting on the Percheron the greater bone and weight of the Shire. The first volume open to pure Percheron blood, and to Percheron mixed with not more than 25 per cent of Shire blood, etc.

If we were forthwith to adopt several new registers, such as I have crudely outlined, and could secure sufficient patronage for each, it is not only possible, but extremely probable, that in the next two decades we should advance much faster than if we continue to confine ourselves within the lines of the present purebreed registers. I should be loath to see any of our purebreed registers relax its strict rules of entry, and so risk the dissolution of the animal type it has taken so many years to fix, but without interfering with these, and while still maintaining all these strictly, I cannot see any reason for confining ourselves to them. Our forefathers handed down to us the large number of excellent varieties with which the past two generations have been engaged—gathering them carefully into their respective folds, supplying them with registers, firmly fixing their several types, multiplying the number of individuals, and greatly improving their general standard of excellence. So much excellence has been attained that there are persons who say that we have nearly reached perfection in our breeds of horses, cattle, sheep, and swine. Nevertheless, if we compare these more important animals with dogs in respect to the number and perfection of varieties adapted to man's use, the comparison will help us to appreciate how far we are still behind the possibilities. Having then all this good material, these purebreeds, each so securely safeguarded by books of record and registration societies, that we can afford to experiment without the fear of extinction to any of them, which was a real and grave danger before these safeguards were established, it would appear to me reasonable and progressive to design plans for making more varied use of this material than at present. To leave such work to individual enterprise is to leave it undone; for the individual cannot afford it, and if he could, would still need cooperation to be successful. The first thing to be done after deciding upon the direction of each particular advance, and the breed or breeds to be involved, is to establish a register. The founding of the register would be the unfolding of the standard around which I think a goodly number of recruits would flock in the case of every well designed plan.

I will suggest another register of a character so general that it might properly be adopted by the U. S. Department of Agriculture. This we might christen tentatively, "The American Experimental Live-Stock Record," to have a section each for horses, cattle, sheep, and swine; to be open for the entry of all crosses between established breeds, and of all hybrids; to be under the supervision of a committee of professional men, and, in addition to the particulars usually given

in a stud or herd book, to give all details obtainable as to color, form, etc. To be published in the first instance in bulletin form at frequent intervals, so that the information might be available to breeders and students as early as possible. Such a book would preserve a fund of information (which would otherwise be largely scattered and lost) gathered from all those who by design or accident might make such crosses. It would be very valuable to breeders, and also to persons studying the laws of heredity. Many of the crosses recorded in it might, and probably would be, valueless in the ordinary sense, but nevertheless the record of them might be extremely valuable in discovering dominant and recessive characters, in respect to color; hair, horn, hoof, bone, sinew, muscle, fat, constitution, etc. Many who would like to make experimental crosses between purebred animals, are loath to lose registration. Registration in the Experimental Record would compensate to some extent for loss of registration in the purebreed records, and might eventually be considered quite as honorable and valuable. If desirable, it might be made as valuable by a commendatory form of registration certificate in worthy cases. Should the "Experimental Record" result in the forming of new varieties, it would have preserved in its volumes all the data with which to launch such varieties into independent existence, each with its own herd or stud book.

The foregoing remarks refer to advancement in the *van* of stock-breeding. The bringing up of the rear is likewise important, and a further use of registration would probably help this end along too. Local registers (for example, township or county registers), for grades, would probably encourage a more general use of purebreed bulls, and induce the farmer to take more interest in his grade females. These registers for grades would have to be extremly local, as otherwise they would soon become too voluminous.

Now, to conclude with a few more words: Notwithstanding the very short number of years since registration became general, some of our record books have already become exceedingly bulky. The annual flow of entries into them is becoming almost unwieldly, and is constantly increasing in volume. Might it not be advantageous to turn a portion of these streams into fresh channels? The Battle of the Breeds has always "given life" to stock-breeding. Would it not add more interest to bring on new contestants?

REPORT OF THE COMMITTEE ON BREEDING POULTRY.

By Prof. JAMES E. RICE, *Chairman, Ithaca, N. Y.*

The committee desires to submit the following report:

1. The great vital need in poultry husbandry at this time is more men and means with which to pursue scientific investigation. Almost no provision has been made by the Agricultural Colleges and Experiment Stations for investigating the important scientific problems per-